Murray DAIRY | Dairy Australia

Your Levy at Work

# Water Trading Tool Kit

**July 2015**

## Murray Dairy

Murray Dairy would like to acknowledge Daryl Poole, from RMCG in compiling this report and the contribution from Murray Local Land Services.

Murray Dairy would also like to thank the following people for their input into both the Water Trading Toolkit book and fact sheets:

Lyndall Ash – Department of Economic Development, Jobs, Transport and Resources
Mark Bailey – Goulburn Murray Water
Rick Cross – Dairy Farmer
James Dillon – Dairy Farmer
Margot Henty – Dairy Farmer
Stephen Henty – Dairy Farmer
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Claire Miller – Dairy Australia
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Published by Murray Dairy, July 2015.



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# Contents

# 1 Introduction

Water is a critical input for irrigated dairy farms in the Murray Dairy region. Farmers therefore need an in-depth understanding of the factors affecting their access to water.

The total water available for irrigation has reduced due to the Murray Darling Basin Plan and a period of below average inflows into the major storages. It is now more important than ever for farmers to have a better understanding of the water market and how they can get access to water.

Participating in the water market is now just part of doing business for most dairy farms in the Murray Dairy Region, which means irrigators need to develop their skills and knowledge to make informed and effective water management decisions.

This booklet is designed to help farmers improve their understanding of the factors influencing their access to water and assist in developing practical water purchasing strategies.

# 2 Water basics for the new irrigator

## 2.1 Introduction

Anyone new to irrigation in the Murray Dairy region needs to understand some basics about water management. This starts with the difference between an entitlement (or water share) and allocations.

An entitlement is the legal right to a volume of water.

An allocation is the volume of water allocated against that entitlement each season. The allocated volume can vary with seasonal conditions, and depends on the type of entitlement. For example, a high security entitlement means you will be allocated the full volume almost every year. A lower security entitlement means that in drier years, you will be allocated only a portion of your entitlement volume or nothing at all in the very dry years.

To gain access to water, an irrigator will either own water entitlements and then receive a volume of water based on the seasonal allocation; or they will buy someone else's allocation from the water market. The allocation market is also commonly known as the temporary water market. It is basically water that has been allocated against an entitlement, but the owner has decided to sell the water rather than use it.

For an irrigator owning entitlement, if a seasonal allocation is 80% and they own 100 ML of water entitlement, then they will have 80 ML of water to use in that year.

## 2.2 Entitlements

A range of entitlements are available. The entitlement name will generally relate to its reliability – that is, the average annual volume of water an irrigator can expect to be allocated against their entitlement.

Northern Victoria has two entitlement types in its irrigation systems: High Reliability Water Share (HRWS) and Low Reliability Water Share (LRWS). The total volume of water held in HRWS is about double the volume in LRWS. As the names imply, HRWS is more reliable with an average annual yield of 95%[1] of the entitlement volume versus LRWS at approximately 40%.[2] The reliability of different entitlements will be further explained in Section 3.4.

NSW Murray irrigation districts have three entitlement types: HRWS and General Security (GS). HRWS in the NSW Murray has an average yield of 95%[1] whereas the GS has an average annual yield of 81%[1]. GS is the most common entitlement, representing 90% of entitlements on issue in the NSW Murray. The third is supplementary water licence that is opportunistic water and only available in wetter seasonal conditions.

South Australia has only HRWS, with an average annual yield of 90%.[3]

[1] Average yield is adapted from long-term average annual yield information on the Commonwealth Environmental Water Office website.
[2] Average of LRWS long-term yield on the Murray and Goulburn irrigation systems.
[3] Average yield from the Commonwealth Environment Department's Restoring the Balance progress of water recovery website

## 2.3 Taking delivery of water

Once an irrigator has access to their water, then they need to be able to take delivery of it to their property. A range of costs apply to the storage and delivery infrastructure that make up the irrigation system.

There are fixed costs for activities such as operating and maintaining the storages and irrigation channels (a constant cost irrespective of the volume of water used) and variable costs (based on the volume of water used). Fixed costs generally account for most of your water bill.

Table 2-1 refers to the two major irrigation areas in the Murray Dairy region, the Goulburn Murray Irrigation District in Victoria and the Murray Irrigation area in NSW. The payment principles are similar but with slightly different terminology as outlined in the table.

**Table 2-1: Costs associated with irrigation storage and delivery infrastructure**

| Cost In | Explanation |
|---|---|
| Storage fees | Cost is associated with owning an entitlement and goes towards maintaining the major storages. Storage fees vary on the different irrigation areas and entitlement type. |
| Service (Victoria)<br>Landholding access fee (NSW) | Annual charge to service a property |
| Service point (Victoria)<br>Extra large, large or small outlet charge (NSW) | Annual charge per water delivery point located on a property |
| Delivery Share (DS) (Victoria – Goulburn Murray Water) | Cost attributed to maintaining the irrigation delivery infrastructure. One DS entitles the owner to have 270 ML delivered to their property in gravity irrigation districts and 365 ML in pumped irrigation districts.<br>▪ If an irrigator owns only one DS but has more than 270 ML of water delivered in gravity districts or 365 ML in pumped irrigation districts, they will be charged a casual user fee for every ML above what their DS entitlement (casual user fees range from $50/ML to $90/ML depending on the irrigation system).<br>▪ The casual user fee is for using the infrastructure at a higher rate than what is paid for through the DS. DS cost is fixed irrespective of the volume of water used.<br>▪ The volume that can be delivered under the delivery share is known as the annual delivery allowance (ADA). DS costs vary between irrigation systems but typically range from $2600 per DS to $4800 per DS. |
| Delivery Entitlement (DE) (NSW – Murray Irrigation Limited) | Cost attributed to maintaining the irrigation delivery infrastructure. One DE entitles an irrigator to have 1.2 ML of water delivered to their property. For example an irrigator owning 100 DE can access 120 ML before casual user fees are applied (casual user fees range from $26/ML to $46/ML).<br>DE costs are in the range of $10 per DE. There is also temporary trade in Des to avoid casual usage fee.<br>MIL also have efficiency allocations and are issued against permanent Des. |
| Infrastructure Use Fee (Victoria)<br>Standard water usage Fee (NSW) | Cost per ML of water used on a property. In Victoria this price varies according to the irrigation system (range $5 to $11/ML). |

| | |
|---|---|
| | In NSW the water usage fee is based on a tiered price structure with first 5 ML charged at $130/ML, water used from 6 ML to 100 ML is charged at $27/ML and water used above 100 ML is charged at $13/ML. |

The costs in Table 2-1 are only a guide, and will change from year to year. The water authorities publish current prices on their respective websites below:

- Goulburn Murray Water: http://www.g-mwater.com.au/general-information/pricing-review
- Murray Irrigation Limited: http://www.murrayirrigation.com.au/customers/fees-and-prices/

Costs are also associated with the maintenance and access to regional drainage. Fees vary depending on the property location. Details can be found on the above websites.

## 2.4 Termination fees

If an irrigator does not want to continue irrigating and wants to avoid paying the fixed cost of access to the delivery system (DS in Victoria or DE in NSW), then they can either sell their DS or DE to another user or pay a termination fee.

Termination fees were introduced so that when an irrigator exits, their contribution to the fixed costs of maintaining and operating the irrigation delivery system is not then transferred to remaining irrigators, thereby increasing their overall costs.

Termination fees will be approximately ten times the annual fixed charge of the DS or DE.

## 2.5 Water use limits

### 2.5.1 Victoria

Properties using water from the Murray, Goulburn, Loddon and Campaspe regulated systems require a water-use licence. The licence is tied to land and sets out conditions such as how much water you can use on the land in an irrigation season.

The annual use limit (AUL) is the total volume of water that can be used on the property in any one irrigation season. Once the AUL is reached no more irrigation water can be used on that property until next season. The AUL depends on the property's access to drainage, and will range from 5.2 ML/ha to 10 ML/ha.

The AUL can be confused with the annual delivery allowance (ADA), which is the volume of water available to a property before a casual user fee will be charged (refer to Table 2-1). A farmer can exceed their ADA but when they do they will be charged the casual user fee. However once a property reaches its AUL, no more water can be delivered to that property for the remainder of that season.

### 2.5.2 NSW

NSW has total farm water use limits but as most irrigation properties have non-irrigated areas, the limits are generally not exceeded. The range is from 4 – 8 ML/ha on all the property with the amount dependant on irrigation layout and crops grown.

# 3 Overview of the irrigation system

## 3.1 Water sources

The first step when developing a plan to access water is to have a broad understanding of:

- the sources of water
- how the system is managed
- the different water entitlements
- how water is allocated against those entitlements each season

Depending on the farm and location, farmers will be able to meet their needs from various water sources. These include rain, groundwater (shallow spear point systems or deep lead aquifers), surface water delivered either through gravity irrigation channels or via rivers (direct diverters), and access to regional drainage.

It is rare for a single farm to have access to all these different water sources; generally farms will have access to one or two. The most important source for most farms in the Murray Dairy region is regulated surface water, which is the focus of the Water Trading Tool Kit.

A regulated system is a system of streams, creeks, and rivers that is controlled or 'regulated' by water storages which allow the water to be released when required. There are also regulated ground water sources in both NSW and Victoria with these generally classified as shallow and deep.

## 3.2 Southern-Connected Murray-Darling Basin (MDB)

Farmers in the Murray Dairy region need to think beyond their own river catchment when planning their water access and consider the whole southern MDB. The river systems are interconnected and although some restrictions apply to moving water between different trading zones (see section 6), market price is driven by a combination of water supply and demand across the entire southern MDB.

The southern MDB comprised 13 interstate water trading zones covering parts of South Australia, New South Wales and Victoria. This is diagrammatically represented in Figure 3-1.

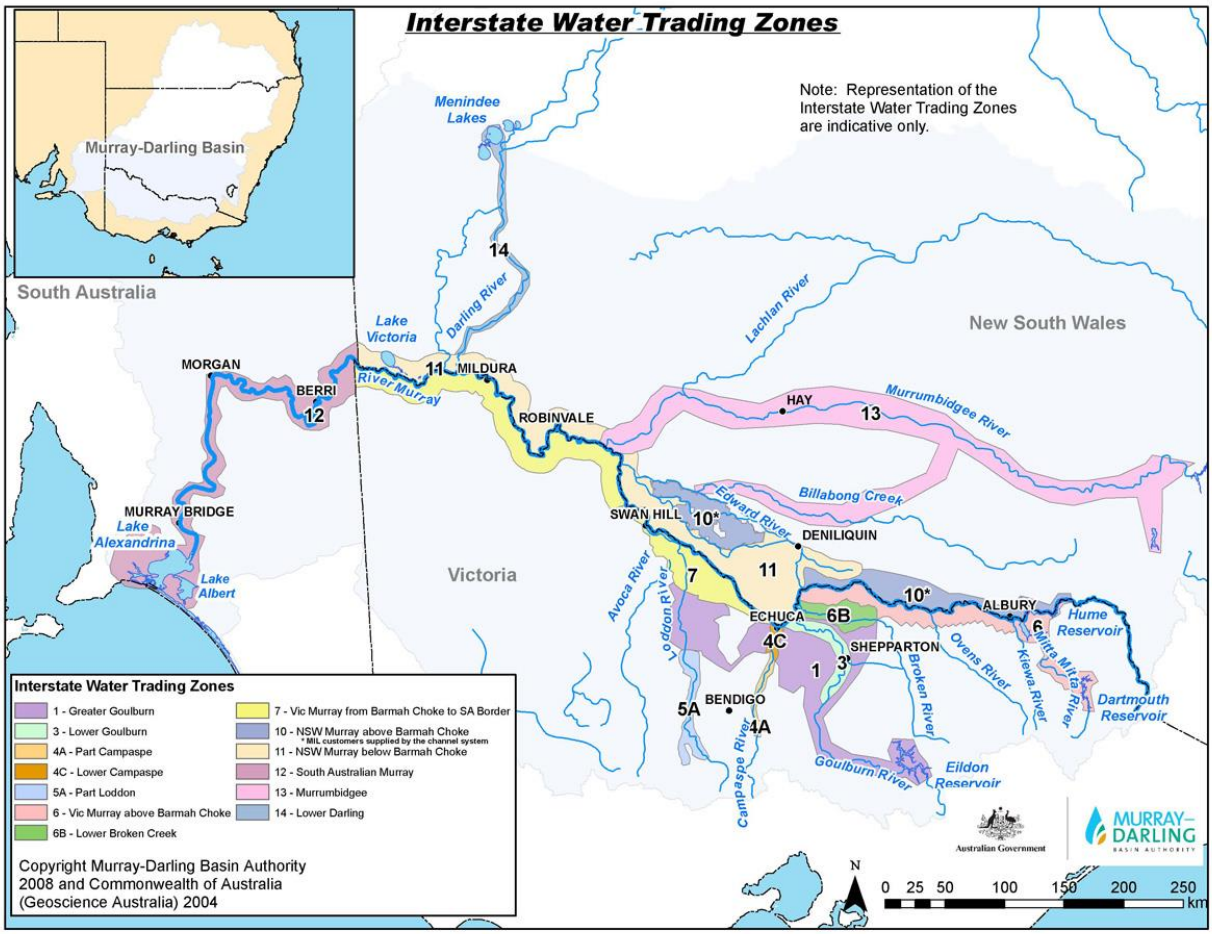



**Figure 3-1: Trading zones within the Southern Connected Basin. Source: Murray Darling Basin Authority (MDBA)**

The entire system is regulated via a series of locks, weirs and storages across the river valleys, delivering water for both the environment and consumptive use. A more detailed map is provided in Appendix 1.

The major storages ranked by capacity in the southern MDB are listed in **Table 3-1**.

**Table 3-1: Major Storages in the Southern Connected Basin**

| Storage | Capacity (GL) |
|---|---|
| Dartmouth (Mitta Mitta River) | 3,856 |
| Eildon (Goulburn River) | 3,334 |
| Hume (Murray River) | 3055 |
| Menindee Lakes (Darling River) | 1731 |
| Blowering Reservoir (Tumut River) | 1631 |
| Burrinjuck Dam (Murrumbidgee River) | 1026 |
| Lake Victoria (Murray River) | 677 |
| Eppalock (Campaspe River) | 305 |

## 3.3 How it works – water sharing

The Murray-Darling Basin Agreement determines how water is shared in the southern MDB between South Australia (SA), New South Wales (NSW) and Victoria. This complex agreement sets out the provisions for sharing water resources between the States, managing trade and maintaining river quality. The Murray Darling Basin Authority (MDBA) is charged with managing water resources in accordance with the Agreement.

In simple terms, all inflows to the River Murray upstream of Albury are shared equally between NSW and Victoria and both States have access to 50% of the storage for those inflows. The inflows provide water to operate the river systems. In addition, the Agreement requires an annual entitlement of 1,850 GL to be available to SA. NSW and Victoria are jointly responsible for providing this entitlement to SA.

All tributary flows downstream of Albury are available to the respective States in which the tributary is located. Water sharing plans in each State govern harvesting and use of tributary flows.

The Menindee Lakes are also a water storage for the River Murray system. Water in the Menindee Lakes is under the MDBA's control as a shared resource until the volume drops to 480 GL. Water below this level is only available to meet NSW requirements. Once the Menindee Lakes are under NSW control, the volume in store must then rise above 640 GL before control reverts back to the MDBA.

This is important to understand as the Menindee Lakes, when under MDBA control, provide additional water into the Murray River system. As the Lakes are downstream of the Barmah Choke (a natural narrowing of the Murray River that restricts rate of flow that can be delivered downstream), the Lakes can help meet water demands in South Australia, and avoid the need to ration deliveries to irrigators upstream on the Murray due to the limited transfer capacity through the Barmah Choke.

The Snow Mountains Scheme consists of a network of 16 major reservoirs, seven hydro-electric power stations and 145 km of interconnecting tunnels that link storage and power stations together. The scheme diverts water from the Snowy, Murray, Tumut and Murrumbidgee Rivers into the storages. This water is either released to either the River Murray or to the Murrumbidgee River (via the Tumut River) generating electricity along the way. There are agreement in place between the states that have involved restoring some of the flows to the Snowy River as well as to the Murrumbidgee and Murray Rivers. There are required annual releases from Snowy Hydro Limited of 1062 GL per year for the Murray and 1,026 GL per year for the Murrumbidgee.

In very low inflow seasons, the sharing rules can be modified to meet critical human and other needs.

## 3.4 Entitlements

### 3.4.1 Entitlement Types

A range of different entitlements exist across the southern MDB, and the value of those entitlements vary according to their reliability (the annual average allocation against that entitlement over time). The four major entitlement types on the regulated surface water system in the southern MDB include:

- High Reliability Water Share – HRWS (which exists in NSW, Victoria and SA). As the name suggests, this is highly reliable with average annual yield in the order of 95%[4] of the entitlement volume.
- General Security water – only in NSW, medium reliability with an average annual yield of 81%.
- Low Reliability Water Share – LRWS (only in Victoria) with an average yield around 40%[4]. It is noted that since 2007, no allocations have been made against LRWS in the Murray and Goulburn systems.
- Supplementary water licence (NSW) – opportunistic water only available in wetter seasons.

### 3.4.2 Seasonal allocations

The seasonal allocation against entitlements will be determined by inflows into the relevant water storages. For example, a HRWS on the Murrumbidgee may have a different seasonal allocation to a Victorian HRWS on the Murray system due to the storages being on different rivers with different capacities, seasonal inflows and allocation policies.

When you own an entitlement, you basically own space in the storage equivalent to the volume of water on your entitlement. Water flowing into the storage is allocated against your entitlement. You can then either use, sell or carryover your allocation into the next season (carryover rules vary by State, see section 6.6).

### 3.4.3 Yield vs Reliability of Entitlements

Entitlement reliability is a function of annual inflows into the relevant storage and the allocation policy for that particular entitlement. Allocation policies vary in each State but as a general rule, NSW focuses on yield at the expense of reliability whereas Victoria focuses on reliability at the expense of yield. In general terms you cant have both high yield and high reliability.

To explain this point, for General Security entitlements in NSW (the most common entitlement), seasonal allocations will be generally based on inflows into storages in that year, with limited reserves having been kept in store from the end of the previous season. In simple terms, what comes in is allocated out, with nothing much left in reserve for the next season. This means allocations largely depend on one year's worth of inflows and subsequently are more variable.

Victoria on the other hand has a more conservative allocation policy. For HRWS (the most common entitlement), water will be allocated in year 1 until 100% HRWS allocation is reached. At that point, no more water is allocated and additional inflows are stored until a 100% allocation for HRWS is assured for year 2. The assurance of reaching 100% HRWS in year 2 is based on the water in store plus a conservative future inflow assumption that has a 99% chance of exceedance (in other words, the future inflow assumptions are based on the worst 1% inflows on record). Once this trigger has been met, allocations against LRWS will be made in year 1.

The result is that Victoria keeps more water in reserve for the following year as a form of insurance against low inflows, making Victorian HRWS more reliable than NSW GS. But it also means that Victoria's share of the system's shared storages such as the Hume are generally fuller than NSW's share and therefore at an increased risk of spilling. The more spills, the less yield over the long term, hence the trade-off between yield and reliability in the two different entitlements types.

[4] Reliability of the entitlements on the different river systems vary. Specific detail for each entitlement is listed in Table 4-1

The different State allocation policies have historically resulted in more agricultural enterprises that need a reliable water source (permanent horticulture and to a lesser extent dairy) being located in Victoria. Conversely, enterprises with more flexible water needs such as irrigated cropping, have developed in NSW (primarily rice production).

Now, with fewer restrictions on trade and the ability to move water between States, the respective reliability of water supply in Victoria and NSW will have less bearing on the location of enterprise types in future.

# 4 Who owns what? Water available for consumptive use.

## 4.1 Restoring the balance

The Murray Darling Basin Plan (MDBP) provides a coordinated approach to water management across the Basin's four States and the ACT. A critical component is to achieve an environmentally sustainable level of water use within Sustainable Diversion Limits (SDLs) across the Basin.

The Australian Government is recovering water to reach those SDLs through a combination of investments in water-saving infrastructure (on-farm and irrigation delivery systems) and direct purchases from irrigators. A significant volume of water entitlements has been secured for the environment, and is now no longer available for consumptive use.

It means less water is available for irrigation than before, and irrigators need to have a good understanding of what water is available to make informed water management and purchasing decisions.

## 4.2 How much water is there and who owns what?

The Basin Plan's implementation is ongoing and therefore the volume held by the Commonwealth Environmental Water Holder (CEWH) will increase over time.

The current volume of entitlements across the river valleys in the southern MDB and how much is owned by the CEWH in volume and as a % of the whole is illustrated in Table 4-1.

The Australian Government is still sourcing water to meet the SDL targets. Irrigators can go to the CEWH website to see current water holdings and environmental water use across the basin: http://www.environment.gov.au/water/cewo/about/water-holdings.

The CEWH also provides information on how much water it used in any particular season and how much it carried over. This can be useful for irrigators looking for an improved understanding of what water is in the different storages and how much is available for consumptive use.

For more information: http://www.environment.gov.au/water/cewo/about-commonwealth-environmental-water for total CEWH used and delivered.

**Table 4-1: Entitlements across the southern MDB**

| State | Entitlement Type | Reliability Class | GL held by irrigators and water authorities[5] | CEWH Entitlements (% of total GL on issue as of February 2015)[6] | Long-term average Yield[7] |
|---|---|---|---|---|---|
| **Murray System** | | | | | |
| NSW | High Security water access licence | High | 182 | 16 (8%) | 95% |
| NSW | General Security water access licence | Medium | 1343 | 327 (20%) | 81% |
| Victoria | High reliability water share | High | 939 | 247 (21%) | 95% |
| Victoria | Low reliability water share | Low | 267 | 22 (8%) | 36% |
| SA | Water Licence | High | 415 | 129 (24%) | 90% |
| **Goulburn System** | | | | | |
| Victoria | High reliability water share | High | 647 | 245 (27%) | 95% |
| Victoria | Low reliability water share | Low | 374 | 22 (6%) | 42% |
| **Broken System** | | | | | |
| Victoria | High reliability water share | High | 17 | 1 (6%) | 95% |
| Victoria | Low reliability water share | Low | 3 | 0 (0%) | 75% |
| **Campaspe System** | | | | | |
| Victoria | High reliability water share | High | 16 | 7 (30%) | 95% |
| Victoria | Low reliability water share | Low | 18.6 | 0.4 (2%) | 49% |
| Loddon System | | | | | |
| Victoria | High reliability water share | High | 18 | 3 (14%) | 95% |
| Victoria | Low reliability water share | Low | 7.5 | 0.5 (6%) | 27% |
| **Murrumbidgee System** | | | | | |
| NSW | High Security water access licence | High | 358 | 7 (2%) | 95% |
| NSW | General Security water access licence | Medium | 1813 | 230 (11%) | 64% |
| | | | **Total (GL)** | **Total (GL)** | |
| **Total High Security (Vic + NSW + SA)** | | | **2592** | **655** | |
| **Total Medium Security (NSW General Security)** | | | **3156** | **557** | |
| **Total Low Security (Vic LRWS)** | | | **670** | **45** | |

[5] GL held by irrigators and water corporations sourced from multiple sources including water authority annual reports, websites and A Guide to the Water Sharing Plan for the Murrumbidgee Regulated River Water Source September 2004.
[6] Commonwealth Environmental Water Holder entitlements as of 28th February 2015. Source: http://www.environment.gov.au/water/cewo/about/water-holdings
[7] Average yield is adapted from long term average annual yield information on the Commonwealth Environmental Water Office website. http://www.environment.gov.au/water/cewo/about/water-holdings

## 4.3 Groundwater resources

Multiple groundwater resources are located in the Murray Dairy Region, providing another water source for irrigated dairy farms. Access to groundwater is determined by property location. Trading groundwater between licence holders has more restrictions compared with trading surface water.

Groundwater resources are categorised into shallow and deep. Shallow groundwater resources are typically within 25 m of the surface and in the past were a problem with rising water tables and subsequent salinity effects.

Shallow groundwater is extremely variable in both quality and quantity across the region. There are approximately 200,000 ML of shallow groundwater shares but the level of actual use is unknown; the estimated annual extraction is approximately 60,000 ML.

The region's five deep lead groundwater systems are a more reliable water source. They are:

- Katunga
- Campaspe
- Loddon
- Central Goulburn
- Lower Murray Ground Water Source (NSW)

Each system is governed by individual groundwater management plans. Around 226,000[8] ML in ground water licences is held across the deep lead systems.

## 4.4 Water available for use – seasonal allocations

The amount of water available depends on the nominal volume held in water shares and seasonal inflows, which determine allocations against those shares. Throughout the irrigation season, the relevant authorities will take into account inflows, what is already in store and what water is already committed (i.e. river operations, carryover water). They will then announce an allocation against the different shares.

In northern Victoria, Goulburn Murray Water (GMW) is the authority responsible for assessing seasonal allocations. The NSW office for Water is the responsible authority for NSW allocations.

Seasonal allocations are generally made on the 1st and 15th of the each month (or the next business day if those days are on a weekend or public holiday). The water authorities also estimate the probability of future allocations, which is important information for irrigators planning for their requirements. The latest allocation information and water outlook information can be found on these websites:

Victoria: http://www.nvrm.net.au/allocations/current.aspx

NSW Murray: http://www.murrayirrigation.com.au

NSW Murrumbidgee: http://www.mirrigation.com.au/Home

[8] Source: http://www.bom.gov.au/water/nwa/2010/mdb/notes/2-3.html

**Table 4-2: Water allocations over the past 20 years**

| Season | Vic Murray HRWS | Vic Murray LRWS | Goulburn HRWS | Goulburn LRWS | Campaspe HRWS | Campaspe LRWS | Broken HRWS | Broken LRWS | Loddon HRWS | Loddon LRWS | NSW Murray High Security | NSW Murray General Security | NSW M'bidgee High Security | NSW M'bidgee General Security | SA Class 3A |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1995/96** | 100 | 100 | 100 | 50 | 100 | 100 | | | | | 100 | 100 | 100 | 100 | 100 |
| 1996/97 | 100 | 100 | 100 | 100 | 100 | 120 | 100 | 70 | 100 | 90 | 100 | 100 | 100 | 100 | 100 |
| 1997/98 | 100 | 30 | 100 | 20 | 100 | 90 | 100 | 70 | 100 | 10 | 100 | 84 | 100 | 90 | 100 |
| 1998/99 | 100 | 100 | 100 | 0 | 100 | 0 | 100 | 70 | 100 | 0 | 100 | 93 | 100 | 85 | 100 |
| 1999/2000 | 100 | 90 | 100 | 0 | 100 | 0 | 100 | 70 | 100 | 0 | 100 | 35 | 100 | 78 | 100 |
| 2000/01 | 100 | 100 | 100 | 0 | 100 | 120 | 100 | 70 | 100 | 0 | 100 | 95 | 100 | 90 | 100 |
| 2001/02 | 100 | 100 | 100 | 0 | 100 | 80 | 100 | 70 | 100 | 0 | 100 | 105 | 100 | 72 | 100 |
| 2002/03 | 100 | 29 | 57 | 0 | 100 | 0 | 100 | 0 | 57 | 0 | 100 | 10 | 100 | 38 | 100 |
| 2003/04 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 70 | 67 | 0 | 100 | 55 | 95 | 41 | 95 |
| 2004/05 | 100 | 0 | 100 | 0 | 39 | 0 | 100 | 70 | 100 | 0 | 97 | 49 | 95 | 40 | 95 |
| 2005/06 | 100 | 44 | 100 | 0 | 31 | 0 | 100 | 70 | 100 | 0 | 97 | 63 | 95 | 54 | 100 |
| 2006/07 | 95 | 0 | 29 | 0 | 0 | 0 | 77 | 0 | 0 | 0 | 69 | 0 | 90 | 10 | 60 |
| 2007/08 | 43 | 0 | 57 | 0 | 18 | 0 | 71 | 0 | 5 | 0 | 50 | 0 | 90 | 13 | 32 |
| 2008/09 | 35 | 0 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 95 | 9 | 95 | 31 | 18 |
| 2009/10 | 100 | 0 | 71 | 0 | 0 | 0 | 17 | 0 | 3 | 0 | 97 | 34 | 95 | 31 | 62 |
| 2010/11 | 100 | 0 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 0 | 100 | 100 | 100 | 105 | 67 |
| 2011/12 | 100 | 0 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 0 | 100 | 100 | 100 | 105 | 100 |
| 2012/13 | 100 | 0 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 0 | 100 | 100 | 100 | 105 | 100 |
| 2013/14 | 100 | 0 | 100 | 0 | 100 | 46 | 100 | 100 | 100 | 0 | 100 | 100 | 95 | 68 | 100 |
| 2014/15 | 100 | 0 | 100 | 0 | 100 | 0 | 100 | 100 | 100 | 0 | 97 | 61 | 95 | 51 | 100 |
| **20Y Average** | **93%** | **31%** | **87%** | **6%** | **73%** | **40%** | **88%** | **59%** | **75%** | **5%** | **95%** | **63%** | **97%** | **64%** | **86%** |
| **10YAverage** | **87%** | **4%** | **79%** | **0%** | **55%** | **35%** | **77%** | **57%** | **61%** | **0%** | **91%** | **57%** | **96%** | **57%** | **74%** |

Notes for Table 4-2:

- Victorian water entitlements were unbundled and separated from land in July 2007. Allocations prior to 2007/08 listed under HRWS and LRWS refer to Water Right and Sales.
- Reflects the approximate final 'equivalent' final water allocations after 52% of water in allocation accounts was suspended in 2006/07 and reinstated in 2007/08.
- The allocations shown are effective end-of-season allocations available after a reduction of 5% due to severe drought in 2006/07. This allocation was repaid in 2007/08 and is in addition to the allocation shown above for that year.
- Average 20-year allocation line is actually 19-year average for Broken and Loddon systems
- 2014/15 allocations are actual allocations as of 1 April 2015.

Table 4-2 provides the actual allocations on the different irrigation systems for the past 20 years. It shows that average allocations were lower than the long-term average shown in Table 4-1. This is more pronounced in the last 10 years, reflecting a prolonged period of severe drought. Individual irrigators will need decide for themselves whether they feel these trends are the new normal.

## 4.5 Impact on irrigators

The combination of lower inflows and the Australian Government securing water for environmental purposes has reduced the total volume of water available for irrigation. There will be increased pressure to get more from less as demand for water grows. Irrigators will need to develop more sophisticated water purchasing strategies to effectively manage their water risk.

The water market has evolved over past 20 years with a range of products now available to meet irrigators' water needs. Irrigators can meet their seasonal needs from one extreme of owning sufficient water entitlements providing sufficient allocations, to the other of buying all their water from the allocation, or 'temporary', market.

The strategies implemented by irrigators will be an individual decision, driven by financial position, risk appetite and view of future water demands and trends. This will be further discussed in section 5.

# 5 Securing your water needs

## 5.1 Knowing what you need

The first step in developing a water access strategy is determining the volume of water required to support production needs. Developing feed budgets and watering plans is an important step in determining the volume of water required to meet production needs.

Water should be considered as another input into the feeding system. As seasonal water availability and price changes, so will your watering decisions.

All irrigation farms need a good understanding of what a ML means on their farm. The yield achieved per ML of irrigation water used varies considerably between and within farms. This information is important, as it will help determine the most cost-effective feed management decisions.

Determining optimal water requirement for an individual farm is complex. Every farm has different circumstances to be taken into account. Developing your own price triggers and break-even points will assist in making water purchasing decisions. Seeking assistance from trusted advisors is recommended.

## 5.2 Accessing water

As the water market has matured, more products are now available for individual irrigators to access water. Options include:

- Owing entitlement and gaining access through seasonal allocations
- Leasing entitlement from others and then gaining access through seasonal allocations
- Entering into a forward contract for delivery of allocation water in the subsequent season
- Purchasing allocation water directly from the market
- Using carryover on entitlements owned (or leased) to manage exposure to the allocation market from one season to the next.

The different products have a range of pros and cons. Irrigators need to assess their own position and determine the appropriate mix for their circumstances. Factors influencing the mix of products include:

- Attitude to risk
- View of the future in terms of water access and price
- Financial position
- Capacity and attitude to participation in the allocation water market.

Table 5-1 summarises some factors irrigators need to consider when developing strategies to access water.

**Table 5-1: Advantages/disadvantages of different water access strategies**

| Water source | Advantages | Disadvantages |
|---|---|---|
| Ownership of entitlement | ▪ Access to water through annual allocations in perpetuity<br>▪ Reduced exposure to the allocation water market<br>▪ Benefit from any appreciation of entitlement value<br>▪ Provides some security of access to water at a known cost<br>▪ Provides access to a carryover<br>▪ Low level of active management required | ▪ Exposed to allocation risk<br>▪ Opportunity cost of capital – capital is tied up in ownership that could be used for other purposes<br>▪ Annual storage charges incurred<br>▪ Exposed to any depreciation of entitlement value |
| Leasing entitlement | ▪ Access to water through annual allocations for the term of the lease<br>▪ Reduced exposure to the allocation water market<br>▪ Generally less cost required to gain access compared to ownership<br>▪ Not exposed to any depreciation of entitlement value<br>▪ Provides some security of access to water at a known cost<br>▪ Provides access to carryover (need to check conditions on lease) | ▪ Exposed to allocation risk<br>▪ No benefit to any appreciation of water entitlement value<br>▪ Annual storage charges often included on top of lease costs<br>▪ Medium level of active management required |
| Forward Contracts | ▪ Provides certainty to access to water at a known cost for the period of the contract<br>▪ Not exposed to allocation risk<br>▪ Reduced exposure to the allocation water market<br>▪ Generally less cost to gain access to water compared to ownership but more expensive than leasing<br>▪ Not exposed to any depreciation of entitlement value | ▪ No benefit to any appreciation of water entitlement value<br>▪ Generally no annual storage fees (need to check details of agreements)<br>▪ Cost is set and therefore can represent a higher water cost if allocation water market drops below contract rate.<br>▪ No access to carryover<br>▪ Medium level of active management required |
| Allocation water market | ▪ No exposure to any depreciation of water entitlement value<br>▪ No annual storage fees<br>▪ No capital costs | ▪ Exposed to the allocation market<br>▪ Exposed to allocation risk in the form of higher water prices (at low water allocations, water price will be higher)<br>▪ Require access to cash to purchase when needed<br>▪ No benefit of any appreciation of water entitlement value<br>▪ No access to carryover<br>▪ High level of active management required<br>▪ Cash readily available as there are limited terms available when purchasing allocation water |

There is no set recipe on the best mix of water products. Some irrigators can operate effectively with very little water ownership as they have a high capacity and willingness to participate regularly on the allocation market (high level of active management). Others with less time or with other business strengths will be vulnerable if they have a high exposure to the allocation market.

Irrigators need to ask themselves how important water is to their business. If the answer is very important, then they need to develop a risk management strategy around access to water.

The Murray-Darling Basin Plan means less water is available for consumptive use, which is even further reduced if the last 20 years of inflows is a guide to the future. If we could predict the future, we would not need a risk management strategy, but as we can't, individuals need to determine the level of risk they are comfortable with and what protection measures are implemented.

More and more irrigators are critically assessing their water needs, with many considering a mixed portfolio to spread the risk. Mixed portfolios include ownership, leasing and some exposure to the allocation market.

# 6 The rules around water trade

## 6.1 What you need to know

The National Water Initiative (NWI), agreed in 2004 by the Council of Australian Governments (COAG), is the national blueprint for water reform. One of its important commitments is the progressive removal of barriers to trade in water to facilitate the operation of efficient water markets and increase the opportunities for trading within and between States and Territories where water systems are connected[1].

However, even with this policy, trade is still subject to some physical limitations as well as some limits imposed to prevent negative third-party effects or environmental impacts.

Irrigators need to develop a working knowledge of these restrictions, as they influence what irrigators can and can't do in both permanent and allocation trading. This can be complex and changes can occur between irrigation seasons and within seasons. It is therefore recommended that irrigators always seek appropriate expert advice when considering trading water.

## 6.2 Types of trade

Water trade has three main forms:

- Transfer of water entitlement ownership – permanent. This includes water shares and water access licences.
- Allocation trade – temporary.
- Limited term transfer of water entitlement – lease.

No matter what trade is being undertaken, it is a market-based transaction and the buyer and seller need to agree on the price and other terms and conditions. The relevant authority (or authorities if trade is across different jurisdictions) also needs to approve the trade to ensure that it is feasible and complies with the established water trading rules.

Once the trade is approved it must then be recorded in the appropriate registers. This informs the relevant water authorities of the new volumes of entitlements and allocation available to all parties after the trade.

## 6.3 Transfer of a water entitlement

A water entitlement transfer gives the new owner the right to all future allocations available from that entitlement. The new owner will also be responsible for all associated annual charges. These trades are generally more complex and of higher value than allocation trades and therefore usually take longer to process and approve.

[1] Intergovernmental Agreement On a National Water Initiative Between the Commonwealth of Australia and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory. http://nwc.gov.au/__data/assets/pdf_file/0008/24749/Intergovernmental-Agreement-on-a-national-water-initiative.pdf

Water entitlement transfers give the buyer with a valuable right, but the buyer is also accepting the risks associated with future seasonal conditions and water availability. Water authorities can provide guidance on the reliability of entitlements, but future allocation levels are not guaranteed.

Once a transfer has been approved, the new owner will receive allocations against the entitlement after the date on which the transfer was approved. The allocation will be credited into an allocation account (used to be called an allocation bank account or ABA (Vic), but "bank" is not now widely used as it was confused with financial banks). Allocations made before to the ownership change will remain the property of the seller.

If entitlement buyers and sellers also wish to transfer allocation water, then generally a separate allocation trade application may need to be lodged. Slightly different arrangements and trading options may apply in Victoria and NSW. Traders need to check with the appropriate authority to confirm details.

A water entitlement transfer only changes the entitlement ownership. All other entitlement characteristics remain the same, including the irrigation system that it is associated with.

Some irrigators have looked at spreading their risk by purchasing entitlements across different catchments. In doing so, they need to be aware that limits may apply to delivery of the allocated water to their desired location if the entitlement is associated to a different irrigation system.

For example, if a Goulburn system irrigator purchases HRWS entitlement on the Victorian Murray system, using that water on their property may be restricted if insufficient water entitlement has been 'back-traded' from the Goulburn to the Murray system. This does not mean the water allocated against the Murray entitlement has no value. The owner can sell the allocation water in the trading zone to which the entitlement is assigned, then use the proceeds to purchase allocation water in the trading zone where their property is located.

Irrigators will need to assess if a water entitlement portfolio of entitlements spread across different irrigation systems provides a sufficient reduction in water risk to justify the expense and effort.

## 6.4 Allocation trade

Allocations against entitlements are volumes of water available for entitlement owners to use, sell or carryover into the next irrigation season. If they decide to sell, this is called allocation trade. This used to be called temporary trade as it was water only available for use in the current year.

Anyone who has an allocation account and has water in that account can sell that water in the allocation market. A series of trading rules that govern allocation trades are covered in sections 6.7 to 6.10.

## 6.5 Limited term transfers

A limited term transfer (LTT) is in effect a lease of a water entitlement to another person. The LTT holder receives all the allocation against that water entitlement during the LTT period.

As the name suggests, shares are in effect "transferred" to the LTT holder, who receives virtually all the benefits that ownership of the water would provide. At the end of the agreed term, the water shares revert to the original owner.

An LTT must be approved by the relevant water authorities to ensure compliance with trading rules. It must also be registered in the Water Register so that allocations can be automatically credited to the holder of the LTT's ABA during its term.

In Victoria, a new 'standing direction' was recently introduced that allows a water share owner to direct all future allocations to go to another person. This is implemented by linking the water share to an allocation account held by the other person. This is similar to LTT but some important differences include:

- The holder of the LTT has the right to terminate the LTT, but a standing direction can be terminated by the water share owner
- The standing direction is not recorded by the Water Register
- The standing direction is quicker and cheaper than a LTT[2].

NSW offers a similar option for water access licence holders. The transaction is called a term transfer and the entitlement owner can transfer it to another person for a set period. The minimum period is 6 months.

## 6.6 Carryover

### 6.6.1 What is it?

Carryover is another tool irrigators can use to manage their access to water in a given season. It allows irrigators to carryover water in their allocation account from one season into the next.

Carryover has been available in NSW for many years. It was first introduced in Victoria in 2007/08. Carryover has different rules in different States, as outlined below.

### 6.6.2 NSW carryover

Carryover limits on general security entitlements differ between the NSW Murray and the Murrumbidgee irrigation systems. In both systems, no carryover is available on high security entitlements.

**NSW Murray**

A general security water owner in the NSW Murray is limited to carrying over 50% of the volume they hold in entitlements. The maximum volume of annual allocation and carryover held is set at 110% of entitlement.

This means that if an irrigator chooses to carryover 50% of their entitlement volume into the next season, once allocation in that next season reaches 60% (50% + 60% = 110%) then no additional water is allocated to their account, even if seasonal allocations continue to increase (i.e. additional allocation is forfeited and that carryover plus allocation cannot exceed 110%).

[2] Changes to Victorian water trading rules arising from the Murray-Darling Basin Plan Frequently asked questions (FAQs) – 2014. http://waterregister.vic.gov.au/images/documents/FAQs%2019062014.pdf

**Murrumbidgee irrigation**

The Murrumbidgee carryover rules are similar to NSW Murray, except that the maximum volume is limited to 30% of the individual's held entitlement, and the maximum combined volume of annual allocation and carryover in any one year is set at 100% of entitlement.

This means that if an irrigator chooses to carry over 30% of their entitlement volume into the next season, once allocation in that next season reaches 70% (30% + 70% = 100%) then no additional water is allocated to their account, even if seasonal allocations continue to increase (i.e. additional allocation is forfeited).

For both the NSW Murray and Murrumbidgee systems, no loss factor is debited off carryover water when carrying water over from one season to the next.

### 6.6.3 Victorian carryover

**How is does it work?**

Carryover in Victoria is more complicated than in NSW, with spillable accounts and water able to be carried over against both LRWS and HRWS. Since carryover was introduced in 2006/07, the rules have changed several times. To avoid any confusion, only the current carryover rules will be outlined in this tool kit. The following applies to the Victorian Murray, Goulburn and Campaspe Water systems.

- Water can be carried over against both HRWS and LRWS up to a limit of 100% of the volume of water shares attached to an allocation account.
- If both HRWS and LRWS are attached to an allocation account, any water carried over will be first deemed to be carried over against LRWS. Once the 100% limit has been reached the remaining water carried over will be deemed to be carried over against HRWS. This will happen automatically when both HRWS and LRWS are attached to an allocation account.
- There is a 5% reduction on water carried over from one season to the next to allow for evaporation. For example, if an irrigator carries over 100 ML of water, then only 95 ML will be transferred into their allocation account for the following season.
- Once the combined volume of water carried over and the seasonal allocation on the water share reaches 100% of the irrigator's total water share volume, any further allocation against that water share will be transferred to a spillable account.

  For example, if 100 ML of water has been carried over on 100 ML of HRWS, then 95 ML will be transferred to the irrigator' allocation account (5 ML deducted for evaporation).

  The first 5 ML (5% of 100 ML of HRWS) of allocation against HRWS in that season will also be available in the account for use. However, further allocation increases against HRWS mean the combined total of water carried over plus seasonal allocation will exceed 100% of the water shares held by the water owner.

  The allocations above 5% will be transferred into a spillable account until the risk of the storages spilling is low. So if allocations reach 100% prior to a low spill risk being announced, in this example, 95 ML will be sitting the spillable account and at risk of being lost to the irrigator if the storages spill.
- Water in the spillable account is quarantined (the water shareowner cannot use or sell that water) until Goulburn Murray Water (GMW) announces a low spill risk. A low spill risk is defined as a less than 10% chance the storages will spill for the remainder of the season. Once a low spill risk has been announced, water in spillable accounts will be transferred back to the allocation account to which the water shares are attached and become available for use, sale or for carryover into the next season.

- When water is quarantined in the spillable account, it is at risk. If the storages spill then water will be deducted from the spillable accounts in proportion to the spilt volume (i.e. if 200 GL is in spillable accounts and 100 GL spills, then spillable accounts will be reduced by the equivalent amount i.e. 50%).
- The storages assessed to determine spills are Lake Eildon for the Goulburn system, Hume Dam for the Victorian Murray system and Lake Eppalock for the Campaspe system.

A more detailed example of how carryover works can be found in Appendix 2.

**Loddon, Bullarook and Broken Water systems**

The Loddon, Bullarook and Broken Water systems are smaller catchments with different carryover rules. Carryover is limited to 50% of entitlements and these systems have no spillable accounts.

When an irrigator carries water forward in these systems, and the sum of the carried over volume and allocations against the water share reach 100%, the water share owner will not receive any further allocation against that water share.

For example, if an irrigator with HRWS on the Loddon, Bullarook or Broken systems carries over water equivalent to 50% of their entitlement (the maximum carryover volume), then:

- 5% will be deducted for evaporation, leaving 47.5% of the entitlement volume in the allocation account going into the next season
- When the allocation in that following season reaches 52.5% (47.5 + 52.5 = 100%) the entitlement owner will not receive any further HRWS allocation for the remainder of that season.
- The same principle applies to allocation carried over against LRWS.

Further information on the carryover rules for these smaller catchments is on the Victorian Water Register (http://waterregister.vic.gov.au/water-entitlements/carryover/carryover-rules).

**Carryover trends**

In Victoria, carryover is a relatively new tool to help irrigators manage their water resources. Irrigators use carryover to secure some access to water in the following season rather than being fully exposed to seasonal allocations or the allocation market.

Irrigators have used this tool extensively in recent years with significant volumes of water carried over from one season to the next.

Table 6-1 shows the total volume of carryover at the end of the season in the three major irrigation systems (Vic Murray, Goulburn and Murray Irrigation NSW) in the Murray Dairy Region. The volume in brackets represents the volume of carryover held by the environment. Note: the carryover volume for the NSW systems is total water carried over, as the split between water carried over by the environment and water carried over by irrigators is not readily available.

It shows that large volumes of water are carried over from year to year, mainly by irrigators. Even in the drought years of 2007-08 and 2008-09, water was carried over as a form of risk management. In the subsequent wetter years from 2010-11 and 2011-12, large volumes of water were carried over especially on the Victorian systems. This has reduced the water available for allocations, as previously any water not used at the end of the season went back into the communal pool for allocation in the following year.

The information presented for the Murray Irrigation Limited is only water carried over in that business and does not include all carryover on NSW general security. This information needs to be more readily available to allow irrigators to make more effective water purchasing and selling decisions.

In Victoria, improved information is now available to irrigators on the volume of unused water at any time of the year and how much of that water is owned by irrigators, the environment or water corporations. This can help irrigators make more informed water purchasing decisions as they can see how much water is held by the environment and unlikely to become available on the allocation market.

Table 6-1 shows the volume of carryover at the start of each season by irrigators and water corporations. The number in brackets shows the volume of water carried over by the environment.

**Table 6-1: Start of season carryover volume (GL) held by irrigators and the environment on the major irrigation systems in the Murray Dairy Region**

| System | 2011-12 | 2012-13[3] | 2013-14 | 2014-15 | 2015-16[4] |
|---|---|---|---|---|---|
| Goulburn (GL) | 1046 (25)[5] | 970 (11) | 431 (15) | 396 (60) | 262 (58)[6] |
| Vic Murray (GL) | 1209 (175) | 1240 (163) | 755 (88) | 280 (144) | 219 (224) |
| NSW Murray General Security [7] | Not available | 690 | 302 | 501 | 501 |
| Murrumbidgee General Security[8] | 612 | 612 | 551 | 592 | 388 |

It is important for irrigators to know the carryover volumes from one season to the next and who owns that water, as it does contribute to the total water available which in turn influences market behaviour. Irrigators can source this information at http://www.nvrm.net.au/resources.aspx.

## 6.7 Trading rules

Trading rules ensure the orderly operation of water markets. They are designed so that:

- the water product being sold can be physically delivered to the proposed buyer
- trades do not reduce the underlying reliability of water entitlements
- environmental impacts are managed.

A range of rules govern the processes for undertaking trades. These rules cover issues such as:

[3] Carryover volumes on the Victorian Murray system have been influenced by changing the 'spill' dam from Dartmouth to Hume on 1 July 2013. Having the spill dam as Dartmouth initially meant that less water was spilt in the Victorian Murray system prior to 2013-14 which has affected the volume of water carried over.
[4] Estimated based on unused water as of 30th June 2015
[5] Environmental carryover volumes for 2011-12 season sourced from Australian Government Commonwealth Environmental Water Fact Sheet – Carryover of Commonwealth Environmental Water – Northern Victoria.
[6] Carryover volumes for the environment is based on actuals as of 30th June 2015 .
[7] Water carried over against NSW Murray GS includes water carried over by the environment. The carryover split between the environment and irrigators is not readily available. Source – NSW Office of Water Media releases.
[8] Water carried over against Murrumbidgee GS includes water carried over by the environment. The carryover split between the environment and irrigators is not readily available. Source – NSW Office of Water Media releases.

- who can participate in the market as buyers and sellers
- establishing the identity of the sellers and buyers
- closing dates for processing of trades in each financial year
- fees to various water authorities to cover costs of transactions.

## 6.8 Trading zones

Trading zones identify geographic areas where trade of water shares and/or allocation can generally occur with little or no restriction. The most important criteria for determining a trading zone is that major water products are sourced from a common supply system/resource. Knowledge of the trading zones allows buyers and sellers to conduct trades with more confidence that the trade is likely to be approved. Trade zones may span several irrigation areas or irrigation supply authorities.

The southern-connected MDB is an interconnected system of major rivers with different trading zones within this system. Trade is possible between some connected zones and trading rules describe the way in which water shares and allocations can be traded from one zone to another. Figure 3-1 shows the trading zones in the southern-connected MDB. Figure 6-1 shows what trades are possible between the different zones.

**Trading capability for declared water systems – northern Victoria**

| To Trading Zone \ From Trading Zone | 1A | 1B | 1L | 2 | 3 | 4A | 4C | 5A | 6 | 6B | 7 | 9A | 9B | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A | a | a | | b | b | a | a | a | b | b | b | | | b | b | b | b | b |
| 1B | a | a | | b | b | a | a | a | b | b | b | | | b | b | b | b | b |
| 1L | a | a | a | b | b | a | a | a | b | b | b | | | b | b | b | b | b |
| 2 | b | b | | a | b | b | b | b | b | b | b | | | b | b | b | b | b |
| 3 | a | a | | a | a | a | a | a | b | b | b | | | b | b | b | b | b |
| 4A | b | b | | b | b | a | a | b | b | b | b | | | b | b | b | b | b |
| 4C | b | b | | b | b | a | a | b | b | b | b | | | b | b | b | b | b |
| 5A | b | b | | b | b | b | b | a | b | b | b | | | b | b | b | b | b |
| 6 | a | a | | a | a | a | a | a | a | a | a | | | a | a | a | a | a |
| 6B | a | a | | b | b | a | a | a | b | a | b | | | b | b | b | b | b |
| 7 | a | a | | a | a | a | a | a | b | a | a | | | b | a | a | a | a |
| 9A | | | | | | | | | | | | a | | | | | | |
| 9B | | | | | | | | | | | | b | a | | | | | |
| 9C | | | | | | | | | | | | a | a | | | | | |
| 10 | a | a | | a | a | a | a | a | a | a | a | | | a | a | a | a | a |
| 11 | a | a | | a | a | a | a | a | b | a | a | | | b | a | a | a | a |
| 12 | a | a | | a | a | a | a | a | b | a | a | | | b | a | a | a | a |
| 13 | b | b | | b | b | b | b | b | b | b | b | | | b | b | b | a | b |
| 14 | b | b | | b | b | b | b | b | b | b | b | | | b | b | b | b | a |

**Note:** Trade of allocation and entitlement is permitted within trading zones 4B and 5B, but not to or from these trading zones.

**Figure 6-1 Trade opportunities between different zones[9]**

[9] Extract from Victorian Water Register website – Trading rules. http://waterregister.vic.gov.au/images/documents/map_water_trading_09July2014.pdf

Figure 6-1 is a guide only and should be read in conjunction with the Trading Rules for Declared Water Systems. Specific rules can sometimes prevent a trade that is shown as permitted and vice versa. However it is a useful guide and subject to the trading rules:

- 'a' indicates that trade is 'always' permitted for allocation and entitlement.
- 'b' indicates that only 'back-trade' is permitted for allocation, and that entitlement trade is not permitted.
- a grey cell indicates that trade (either allocation or entitlement) is not permitted.

Trading rules generally permit allocation trade from one trading zone to other trading zones provided the traded water can readily flow to the destination zone. The trading rules also permit trade in the opposite direction ("back-trade") if previous forward trade has opened up an opportunity.

In order to protect third parties and the environment, some trade limits apply. Some of the important trade restrictions are covered in Section 6.10.

## 6.9 Back-trade

Back-trade is possible when some water has been traded downstream from one system to another. As water cannot flow "uphill", trade from a downstream source to an upstream source can only occur if some downstream trade has already occurred; this is referred to as back-trade.

The most significant back-trade opportunity is from the Murray System to the Goulburn system, but others can arise. The Murray to Goulburn back-trade is explained below as an example, but similar principles apply for other back-trade opportunities.

Back-trade is possible as a result of water being traded downstream from the Goulburn system for use in along the Murray River. Over many years, Goulburn water entitlements have been permanently traded into the Murray system under exchange rate trading arrangements.

When seasonal allocations are made for the Goulburn system, water is allocated against these Goulburn system entitlements that have been traded into the Murray. The water is traced via the Goulburn Valley Account. This account represents water held in the Goulburn system storages for release to the Murray.

Other actions can increase the available balance in the Goulburn Valley Account, including allocation trade from the Goulburn to the Murray and water savings from projects in the Goulburn system as part of Snowy or Living Murray programs.

If the Murray system operator calls for water to be released from the Goulburn to the Murray to help meet demands, the account is reduced accordingly. When there is a positive balance in the Goulburn Valley Account, allocation can be traded 'back' from the Murray to the Goulburn.

The Goulburn Valley Account (and other similar accounts inter-valley accounts) use continuous accounting, so that any balance at the end of the year carries over to become the opening balance for the next season.

Details on the volumes of various allocation back-trade opportunities (including opportunities in NSW from the NSW Murray to the Murrumbidgee systems) are updated regularly on the relevant websites. Back-trade opportunities can be found on the following websites:

- http://waterregister.vic.gov.au/water-trading/allocation-trading:

provides back-trade information for the Goulburn–Murray systems and allocation trade opportunities from NSW to Victoria.

- http://www.statewater.com.au/Customer%20service/water-ordering-trading-pricing/Murrumbidge%20Inter%20Valley%20Trade%20Account%20Status:

  identifies trade opportunities from the Murrumbidgee irrigation system.

## 6.10 Some important trading restrictions

### 6.10.1 Introduction

A large number of specific trading rules apply across the southern-connected MDB and covering each one is not practical. Irrigators should, however, be aware of some key restrictions when developing their water trading strategies.

### 6.10.2 Barmah Choke limits

The Barmah Choke is a natural restriction of flow down the River Murray. The river channel upstream of the Choke can handle flows up to 25,000 ML/day. However the Choke itself can only cope with 8000 ML/day before water will start flowing out of the river channel and into the Barmah/Millewa Forest.

In some years and at certain times of the year, the demand from water users downstream of the choke requires the river to operate at this maximum 8000 ML/day capacity for extended periods. If demand downstream exceeds 8000 ML/day, then water deliveries will be staged to stay within the daily maximum flow through the Choke. This means individual water orders could be delayed and take longer than usual to be delivered to farms downstream of the Choke.

Similarly, if water entitlements issued above the choke (e.g. Zone 6) were traded downstream to below the choke (e.g. Zone 7), then this could increase the demand for water to flow through the choke and exacerbate potential supply restrictions for irrigators in the lower Murray system. Therefore water entitlements cannot be traded from above the Choke (Zone 6) to below the Choke (Zone 7).

Allocation trade can also be restricted for the same reasons. If there has been prior allocation trade from below the choke to above it, then an equivalent volume can be traded downstream through the choke so that the overall channel capacity constraints are no worse than before the trades took place.

This can be a dynamic situation. In low allocation years, with less pressure on the delivery system, allocation trade limits through the Choke can be temporarily lifted. For example, allocation trade restrictions were reintroduced in October 2104, for the first time since restrictions were lifted in September 2007 due to the drought and low allocations reducing the overall volumes flowing through the Choke.

The Murray Darling Basin Authority website provides updates on trade opportunities through the Choke and keeps track of the net trade from downstream of the choke to upstream. This information can be sourced at: http://www.mdba.gov.au/river-data/barmah-choke.

### 6.10.3 Victoria-NSW Allocation Trade Limits

Allocation trade from NSW to Victoria is restricted based on two criteria: a net trade of 200 GL or the volume that keeps the spill risk in Victoria below 50%. The trade limit is set at the lesser of these two criteria. The Victorian Water Register provides updates on trade opportunities during the season between the States. This information can be sourced at: http://waterregister.vic.gov.au/water-trading/allocation-trading

### 6.10.4 Goulburn to Murray Allocation Trade Limits

Allocation trade from Goulburn to Murray is limited to a net 200 GL per year. The Victorian Water Register provides updates on trade opportunities during the season between the two systems. This information can be sourced at: http://waterregister.vic.gov.au/water-trading/allocation-trading

### 6.10.5 Murrumbidgee Trade Limits

The Murrumbidgee inter-valley transfer (IVT) account keeps track of net allocation trade to and from the Murrumbidgee valley. The maximum balance is 100 GL, which is the maximum volume that can be physically traded out of the valley in one year. If the balance is recorded as 25.4 GL, this means there is currently capacity for 25.4 GL to be transferred into the valley and capacity for 74.6 GL to be transferred out of the valley. This information can be found at:

http://www.statewater.com.au/Customer%20service/water-ordering-trading-pricing/Murrumbidge%20Inter%20Valley%20Trade%20Account%20Status

## 6.11 Recent trading changes to consider

### 6.11.1 Introduction

The trading rules have been changed in several ways in recent years that may or may not have a material impact on water trading activity. However, irrigators need to be aware of the changes as they can influence their decisions depending on what their view of the changes might mean to future water trading behaviours.

### 6.11.2 4% limit on trades out of irrigation areas

To facilitate more open trade, the 4% limit on the net volume of water shares permanently traded out of an irrigation area in any financial year, as a proportion of the total volume held in that area, has been removed.

### 6.11.3 10% non-water user limits (Victoria only)

When water was unbundled in 2007, a 10% limit was introduced on the volume of water shares in any system that could be owned by non-irrigators. This cap has now been removed. Note: many irrigators hold non-water user shares, having dissociated their shares from their properties for various personal and business reasons. In many cases, they are still using the water for productive use on their properties.

### 6.11.4 Relaxing allocation trade restrictions

Part of the Murray-Darling Basin Plan requires that trade be free of any restrictions unless the restrictions can be justified for specific reasons, such as not being physically able to deliver the water, that the trade will affect third parties, or the trade will affect the environment.

The removal of limits on who can buy allocation removes another trade restriction. The new trading rules:

- Remove the requirement that a buyer must be an owner or occupier of land.
- Remove holding limits on how much allocation people can buy (previous rules restricted holding limits to 2 times the annual use limit).
- Change the management of who can hold an allocation account – previously holders of allocation accounts were those with water entitlements attached to that account.
- Support the practice where holders of water shares can link water shares to allocation accounts held by other people, enabling more flexible farm and business management.

### 6.11.5 What does all this mean?

The recent changes means more people can participate in the water market than previously. It is difficult to predict what impact this might have. Some irrigators are concerned the changes will increase the presence of non-water users speculating in the water market and adversely impacting on their operations. Predicting the water market is a risky business and therefore the value non-water users can extract from the market is limited when buying and selling allocation water.

Non-water users who may want to buy allocation and carry that allocation into the next season will need to either own or lease entitlement to do so. This represents another barrier to the 'water traders', as they will need to invest more capital in buying water shares if they want to carry over allocation water from one season to the next.

Looking at other markets, NSW has had no restrictions on purchasing allocation for many years and there has been no evidence of major new entrants cornering the market to date, although clearly investors are entering the market.

Ultimately, a water trader/investor will want to get a return from their investment. The value of water over the long term will be driven by the profitability of irrigation enterprises.

# 7 Water price – what will it be?

## 7.1 Water market – history

In Victoria, allocation trade was first introduced in 1987, followed by permanent trade in 1991. Over time the water market has grown and matured. Trading is now part of doing business for most enterprises. In NSW allocation trade was first introduced in 1983 with permanent trade of entitlements in 1995.

There are two water markets: one for water shares (previously referred to as permanent trade) and one for allocation water (previously referred to as temporary trade). The trade of water shares will tend to be less volatile than allocation trades, but they are a significant investment and need careful consideration.

As with buying and selling any product or commodity where values vary, information on prices paid and volumes trading are important in determining an appropriate price. A large amount of information is now readily available from State water departments and water authorities. Water brokers are also providing regular updates and information on trades for their clients. More information on useful sites is listed in 8.4.

## 7.2 Water share trading

Irrigators are taking different approaches to how many water shares they own to support their enterprises. Since water trading was introduced, the value of water shares has generally increased but it has not been a steady or predictable with a range of both market and non-market drivers on price as well as seasonal influences. **Figure 7-1** shows HRWS water price movement on the Goulburn system since 1990-91.

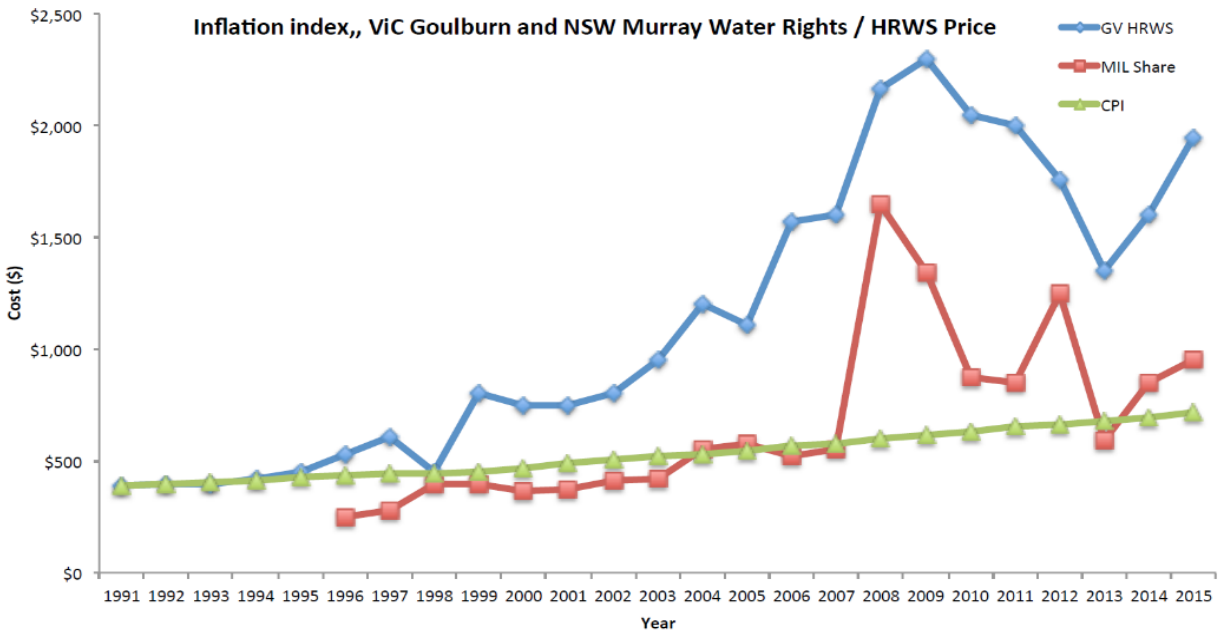



**Figure 7-1: Goulburn Irrigation System HRWS and NSW General Security entitlement prices[10]**

[10] Water prices are indicative only and data has been sourced from various sources including Dairy Australia Water Availability – Background Paper RMCG (August 2009), Henning Bjorland University SA, National Research Flagships – A Summary of Water

Following are notes in relation to **Figure 7-1**:

- CPI is based on Reserve Bank of Australia Calculator using a base of $390 in 1991. 2015 is not yet published; 2015 CPI has been estimated at 2.5%.
- MIL's database is based on sale of MIL shares which are equal to 1 NSW Murray General Security water entitlement. Post-2008 sales excluded the previously applied transmission-loss allowance of 17% of entitlements.
- Until around 2000/01 several administrative/legal mechanisms tied all/part of water sales to land sales, so price/ML reported does not always reflect the water transaction only.
- Development of Victorian and NSW irrigation district infrastructure termination fees for water transfers to 'water-only' accounts caused water entitlement/share values to increase by $200-300 per entitlement.
- Murray Irrigation's price is an average of prices recorded for September each year. 2015 sales are actual sales recorded in March 2015.
- Data is from MIL's web page, Victorian GMW annual reports and Victorian Water Register.
- Some transactions take several years between acceptance and recording of sale in State or company records.

When looking at water price movements over the past 24 years, it is important to take into account some changes that have occurred during that time. Prior to unbundling in 2007, prices were for water rights in Victoria, which had additional 'sales' water attached and were linked to land.

In June 2007 water entitlements were unbundled and separated from land. Water rights were split into high reliability water share (water rights), and low reliability water share (sales) in Victoria. These changes have had implications for the value of high security water and general security water.

Other significant factors have also influenced the rise and fall of prices over time specifically:

- Drought during the 2000s limited water availability, putting upward pressure on prices, particularly from 2005-06.
- Changing profitability of different commodity groups reliant on irrigation water affecting demand and causing some of the volatility.
- Demand from management investment schemes in the early to mid-2000s.
- Direct and indirect government purchase of water entitlements for the environment since 2008 under the Murray-Darling Basin Plan, further inflating an already high drought-driven price.

**Figure 7-1** shows a significant rise then fall in value from 2006 to 2013, followed by some recovery in 2014. A strong rise in the water price reflected severe drought conditions in the southern Murray-Darling Basin and the Australian Government entering the market to buy water entitlements to meet environmental needs as part of the Murray-Darling Basin Plan. The subsequent fall in prices is due to inflows recovering when the drought ended and the government substantially reducing its buying activity.

Trade and Price Data for the Southern Murray-Darling Basin CSIRO (June 2011) . NSW General Security entitlements value-based on Murray Irrigation entitlement trade information at September of each year.

The recent recovery in price could reflect a more long-term average that is not overly influenced by recent extraordinary climatic and policy reform events. HRWS prices over the last 24 years have risen from $390/ML in 1990-91 to $1600/ML in 2013-14, representing annual growth around 6%. Individual irrigators will need to make their own assessments on what the future will hold in terms of the value of water shares.

## 7.3 Allocation market

### 7.3.1 Price volatility

Allocation trade prices over the past decade have ranged from $5/ML to more than $1000/ML, which demonstrates the volatility that can exist in the market. Predicting the water market is difficult, as allocation trade is influenced by various factors, including:

- Seasonal allocations, which determine the level of supply
- Carryover water volumes in the storages
- Seasonal conditions and irrigation demand
- Timing and magnitude of rainfall events
- Commodity prices
- Conditions in other catchments.

Median allocation trade price in 2013-14 was $75/ML on the Goulburn, rising to $120/ML[11] in 2014-15.

### 7.3.2 Seasonal allocation scenarios

Water availability is a major influence on allocation water price. Irrigators need to take into account what is happening across the entire southern-connected MDB and should not be focused only on their own irrigation system. Trade is now less restricted than in the past and therefore what is happening with NSW general security allocation is just important to a dairy farmer in Kyabram as it is to rice grower in Finley.

Seasonal allocations have a high influence on allocation water price. An understanding of the likelihood of different allocations against the major water entitlements across the southern-connected MDB is important for developing a sense for water availability. That knowledge can then also help inform irrigators about potential price ranges across different water allocation scenarios.

When looking water allocations in the past, we can break up those allocations into 5 scenarios: extreme wet and extreme dry periods, and then a range in between that will be what occurs most of the time. The scenarios are illustrated below with a description of the relevant water allocation against the major water entitlements in those scenarios. The medium scenario is broken into three levels which are determined by the allocation against NSW general security (GS) entitlement.

[11] Median price for allocation trade for the 2014-15 sourced from the Victorian Water Register up to 13 May 2015.

Table 7-1 also has three different future inflow assumptions:

1. Based on Long-Term Cap Equivalents (LTCE) – long-term inflow trends.
2. Based on the last 20 years of inflows.
3. Based on the last 10 years of inflows.

**Table 7-1: Water availability scenarios**

| Scenario | Allocation level | Probabilities – Number of years in 20 | | | Total Water Availability (GL) |
|---|---|---|---|---|---|
| | | LTCE | Based on inflows over the last 20 years | Based on inflows over the last 10 years | |
| Wet | 100 % HRWS, 100% GS, Some allocation against LRWS | 7 | 3 | 1 | 6500 |
| Medium – Wet | 100% HRWS 70–100% GS, 0% LRWS | 4 | 5 | 5 | 6100 |
| Medium | 100% HRWS, 50–70% GS, 0% LRWS | 4 | 5 | 5 | 4800 |
| Medium – Dry | 100% HRWS, 0–50% GS, 0 LRWS | 4 | 5 | 5 | 3600 |
| Drought | <100 % HRWS, 0% GS, 0% LRWS. | 1 | 2 | 4 | 1800 |

Notes for Table 7-1:

- The probabilities are approximations and rounded to give orders of magnitude.
- Water availability is a guide based on the allocation against all the different entitlements in the southern-connected MDB for that scenario. Entitlements include Victoria Murray, Goulburn, NSW GS (including Murrumbidgee) and South Australia.
- Water availability does not include allocation against water entitlements owned by the Commonwealth as of May 2015.
- Water available includes approximately 0.5 GL of ground water
- Scenario probabilities are derived from three inflow assumptions:
  - based on a long-term cap equivalent (LTCE), which is based on inflows and irrigation-development modelling for 113 Years up to 2009
  - looking at the probabilities based on inflow conditions in the last 20 years
  - looking at the probabilities based on inflow conditions in the last 10 years

In the three levels of 'normal' years, the High Security allocation is always 100% in all valleys and States; the only variable is how much NSW General Security is available.

How often each scenario occurs depends upon whether you use LTCE, the last 20 years' inflows or the last 10 years' inflows. As demonstrated in Table 7-1, the last 20 years is worse that the LTCE and the last 10 years is worse again due to the millennium drought.

What this shows is that for most of the time (60-75%), we operate in the normal scenarios irrespective of the inflow assumptions (LTCE, last 20 years or last 10 years). What does change and what can have the biggest impact on irrigation enterprises is the number of dry years in any 20-year period.

If the last 20 years is more reflective of future inflows, then the frequency of dry periods doubles compared to the longer term (2 years in 20 compared to 1 year in 20). If the last 10 years are more reflective of the future then the frequency of the dry period increases four-fold (4 years in 20 compared to 1 year in 20).

Your view of the future will determine your risk management strategies to cope with the dry years. If your view is a return to long-term inflow conditions (LTCE), then not much may need to be done to mitigate the risk due to the infrequency of dry years. However, if you are thinking the last 10 years is the new normal, then strategies will be needed to mitigate against those more frequent dry periods.

Risk management strategies may include:

- Use of carryover water
- A spread of strategies to gain access to allocation water – entitlement ownership, leasing entitlement, future contracts, trading in the allocation water market
- Building up feed reserves
- Growing more water-efficient crops
- Feed supply contracts and forward markets (including future water contracts)

### 7.3.3 Allocation price linked to water availability

Allocation price is clearly influenced by water availability across the entire southern-connected MDB. Table 7-2 provides examples of recent irrigation seasons aligned to one of the scenarios described above, along with the median allocation price in that year. The median allocation price is based on the allocation price on the Goulburn system.

**Table 7-2: Allocation price aligned to the different seasonal scenarios**

| Seasonal scenario | Irrigation season close to the seasonal scenario description | Median allocation price/ML – Goulburn system[12] |
|---|---|---|
| Wet | 2011-12 | $20 |
| Medium – Wet | 2012-13 (100% NSW GS) | $45 |
| Medium | 2014-15 (61 % NSW GS) | $120 |
| Medium – Dry | 2009-10[13] (34% NSW GS) | $165 |
| Drought | 2007-08 (0% NSW GS) HRWS <100% | $400 |

It is important to note that while history is not necessarily a guide to the future, but Table 7-2 does show an obvious relationship between allocation price and water availability that is nothing new to irrigators. What

[12] Median allocation prices is for the Goulburn system and sourced from the Victorian Water Register.
[13] 2009-10 year had 100% HRWS for all valleys except the Goulburn system which had a 71% HRWS allocation. It is considered that this is a reasonably close to the Normal "dry" conditions.

is not so obvious is that in the medium years, allocation price varied from $45/ML to $165/ML when HRWS allocation in most valleys was at 100%.

What changed significantly between those three years was the allocation against NSW Murray GS. In the medium-wet scenario (2012-13), GS allocation was at 100%, the medium scenario (2014-15) GS allocation was 61%, and in the medium-dry scenario (2009-10) GS allocation was 34%.

There will always be other influencing factors affecting allocation price, however particularly in the medium scenarios, NSW GS allocation is a price indicator and needs to be considered when irrigators are working through their water purchasing strategies.

## 7.4 Further reductions – full implementation of the Murray-Darling Basin Plan

Current water availability will be further reduced with the full implementation of the Murray-Darling Basin Plan (MDBP). The plan is set to recover 2750 GL for the environment; more than 1900GL has so far been recovered through buybacks and water-saving projects. Although the Australian Government has announced that it will not secure additional water through more direct buybacks, securing water through government-funded on-farm water efficiency programs will still cause a reduction in the consumptive pool as farmers transfer entitlements equal to a portion of water savings achieved. Irrigators will need to keep informed about the progressive implementation of the MDBP and its implications for water availability.

## 7.5 Who is using all the water in the consumptive pool

As water volumes in the consumptive pool decline, competition for water will increase between the different commodity groups. The volume of water used across different commodity groups has changed significantly in recent years, as illustrated in Table 7-3[14].

**Table 7-3: Water use across different commodity groups in the Southern Connected MDB**

| Year | Rice (ML) | Cotton (ML) | Dairy Pastures (ML) | Pastures Other (ML) | Horticulture (ML) | Cereal (ML) | All other crops (ML) | Total (ML) |
|---|---|---|---|---|---|---|---|---|
| Pre drought 2000-01 | 2,213,832 | 138,902 | 2,076,503 | 462,332 | 741,847 | 452,583 | 235,641 | 6,321,640 |
| 2012-13 | 1,431,609 | 305,992 | 1,432,718 | 431,756 | 1,073,475 | 474,366 | 152,756 | 5,302,672 |

From this it can be seen that over a decade during the 2000s:

- Water availability declined since 2001 due to the federal environmental recovery program and carryover by irrigators 'locking up' water in NSW and Victoria.
- Cotton water use has nearly doubled while rice has reduced by a third.
- Horticulture has increased by 44%.
- The combined water use by dairy and other pastures (much of which supports the dairy industry) has reduced by a quarter.

[14] Information in Table 7-3 is based on ABS data

Access to water by different commodity groups will be determined by how much value they can extract from the use of that water, as reflected in the trends in Table 7-3.

## 7.6 Key decision point calendar

Irrigators need to develop water purchasing strategies and more information will be available to help make those decisions at certain times in the year. Setting up a seasonal watering plan really starts the previous autumn. Table 7-4 provides a key decision point calendar with links to information that will help irrigators develop and refine their water purchasing strategies.

**Table 7-4: Key decision point calendar**

| Month | Price influencers | Activity or decision | Information sources |
|---|---|---|---|
| June | ▪ Annual water markets usually closing or closed.<br>▪ Next seasonal outlooks provided<br>▪ Volumes of unused water (carryover) | ▪ Confirm carryover volumes + outlooks for opening allocations = total starting volume – for both your own individual situation and across all catchments. Provides a sense of the total water available for use or trade in the early part of the year.<br>▪ Ensure your carryover volume does not exceed entitlement owned (Victoria) or does not exceed 50% of general security entitlement owned (NSW) – or you will lose that water at 30 June.<br>▪ Develop a spring watering plan and water purchasing strategy. | ▪ http://www.nvrm.net.au/outlooks.aspx<br>▪ http://www.nvrm.net.au/resources.aspx<br>▪ http://www.murrayirrigation.com.au/media/talking-water<br>▪ http://www.water.nsw.gov.au/water-management/water-availability<br>▪ http://www.mirrigation.com.au |
| July | ▪ Deliveries start, Markets open<br>▪ Seasonal outlooks provided<br>▪ High inflow months still ahead | ▪ Monitor opening allocations (1 July or 15 July) – all valleys.<br>▪ Monitor allocation markets – activity can be low as allocation market buyers/sellers wait to see what spring delivers. | ▪ http://www.nvrm.net.au/allocations/current.aspx<br>▪ http://www.murrayirrigation.com.au<br>▪ http://waterregister.vic.gov.au/water-trading/allocation-trading |
| August | ▪ Large irrigation areas commence water deliveries | ▪ Refine spring water budgets and look to refine buying strategy to meet needs.<br>▪ Next three months of inflows have a high influence on final allocations. | |
| September | ▪ Seasonal conditions – dry spring = high cereal/annual pasture water use increasing pressure on water market<br>▪ Wet spring – less demand | ▪ Assess possible trading constraints.<br>▪ Monitor spill risk.<br>▪ Monitor allocation markets. | ▪ http://www.nvrm.net.au/risk-of-spill.aspx<br>▪ http://waterregister.vic.gov.au/water-trading/allocation-trading#AllocationTradeOpportunities |

| Month | Price influencers | Activity or decision | Information sources |
|---|---|---|---|
| October | ▪ Rice and cotton areas set for the year | ▪ Continue to monitor seasonal allocations in the southern-connected MDB.<br>▪ Assess spill risk – if dam spills assess spill volume. | ▪ http://www.nvrm.net.au/risk-of-spill.aspx<br>▪ http://www.nvrm.net.au/outlooks.aspx<br>▪ http://www.murrayirrigation.com.au |
| November | ▪ November – dam levels generally peak Major inflow months now complete | ▪ Assess total water volumes available (likely to be peak availability).<br>▪ Season water availability largely determined.<br>▪ Assess spill risk – if dam spills assess spill volume.<br>▪ Plan summer watering program. | ▪ http://www.nvrm.net.au/allocations/current.aspx |
| December | ▪ Very hot weather can increase summer crop needs | ▪ Trading and transfers slow over Christmas break (particularly manual transfers).<br>▪ Declaration of low risk of spill often made by December (seasonally determined) – look at volumes of water transferred from spillable accounts – more water available for use or trade. | ▪ http://www.nvrm.net.au/risk-of-spill.aspx |
| January | ▪ Seasonal crop demand | ▪ Critically review watering decisions to ensure water is used effectively. | |
| February | ▪ Final month for rice and cotton watering<br>▪ Finalising plans for autumn irrigation of annual pastures and cereal crops | ▪ Review key water transfer dates for remainder of season.<br>▪ Develop autumn watering plan including initial carryover over targets. | ▪ http://www.g-mwater.com.au/customer-services/end-of-season |
| March | ▪ Irrigators start buying for following season | ▪ Review likely end-season water position.<br>▪ Look at how much water is in reserve for the following season in Victoria – provides | ▪ http://www.nvrm.net.au/resources.aspx<br>▪ http://www.murrayirrigation.com.au<br>▪ http://www.mirrigation.com.au |

| Month | Price influencers | Activity or decision | Information sources |
|---|---|---|---|
| | | some indication for next season's allocations.<br>▪ Look at NSW General Security allocation – if at 100% then some water may potentially be in reserve for the following year. If less than 100% then no water will be in reserve and allocations for the following year will completely depend on future inflows. | |
| April | ▪ Seasonal conditions will influence allocation price<br>▪ Dry autumn = carryover buyers | ▪ Check last days for transfers to be processed. | ▪ http://www.murrayirrigation.com.au<br>▪ http://www.g-mwater.com.au/customer-services/end-of-season |
| May | ▪ Irrigation areas close systems for maintenance<br>▪ Next season water outlooks | ▪ Complete last sale / confirm carryover balances. Develop spring watering plan. | ▪ http://www.nvrm.net.au/outlooks.aspx<br>▪ http://www.water.nsw.gov.au/water-management/water-availability |
| June | ▪ Water transfers and trades cease for 7-30 days | ▪ Review season and purchasing decisions and develop next season strategies<br>▪ Confirm carryover volumes – both individual and all catchments in the southern – connected MDB | ▪ http://www.nvrm.net.au/outlooks.aspx<br>▪ http://www.nvrm.net.au/resources.aspx<br>▪ http://www.murrayirrigation.com.au/media/talking-water/<br>▪ http://www.water.nsw.gov.au/water-management/water-availability |

No season is the same and therefore irrigators need to continually assess what is happening in the water market and adjust their decisions accordingly.

# 8 How to conduct a trade

## 8.1 The paperwork

Different processes are involved for each type of trade transaction. Also, each State has different processes and application forms. If you are not sure what to do, the first step is to contact your water supplier to check the arrangements that apply to the type of trade you are considering.

Various forms, processes and approvals are involved depending on the type of trade, whether it be transfer of entitlement or an allocation trade. This information can be obtained from water corporations. State water management departments provide information on trade processes and requirements on their websites. Water brokers are also a valuable source of information and can assist you with what is required with the different water purchasing or selling options you want to conduct.

## 8.2 Who can help

Just as farmers develop important relationships with their feed suppliers, financers and farm advisors, the same is needed with water brokers. The water market is complex and it can be difficult to continually keep up to speed with all that is required when making water purchase or selling decisions.

Water brokers will have access to a wider cliental and it is their business to keep up-to-date on changes that can influence water trade decisions.

There are two main forms of water broking services. Some brokers parcels of water that irrigators want to sell or buy and then match buyers or sellers (much like a real estate agent will match buyers and sellers of a property). Some brokers also offer their services online and can be a valuable source of trade information.

There are also water exchanges where buyer and seller bids are placed on the exchange and individuals can decide whether to take the option of sell or buy orders. Water Pool (http://www.waterpoolcoop.com.au) is another exchange where buyer and seller bids are placed in a weekly pool and a “pool price” is struck that establishes the market price that applies to all trades on that exchange day.

Different water products have also emerged, offered by different organisations/brokers. Products include:

- Leasing entitlements
- Leasing entitlements for carryover purposes
- Forward water delivery contracts.

## 8.3 Working with water brokers

No special laws or regulations apply to water brokers, but they are subject to the general fair trading laws covering businesses in all States. The Australian Competition and Consumer Commission (ACCC) has developed brochures to help irrigators and water brokers understand their rights and obligations:

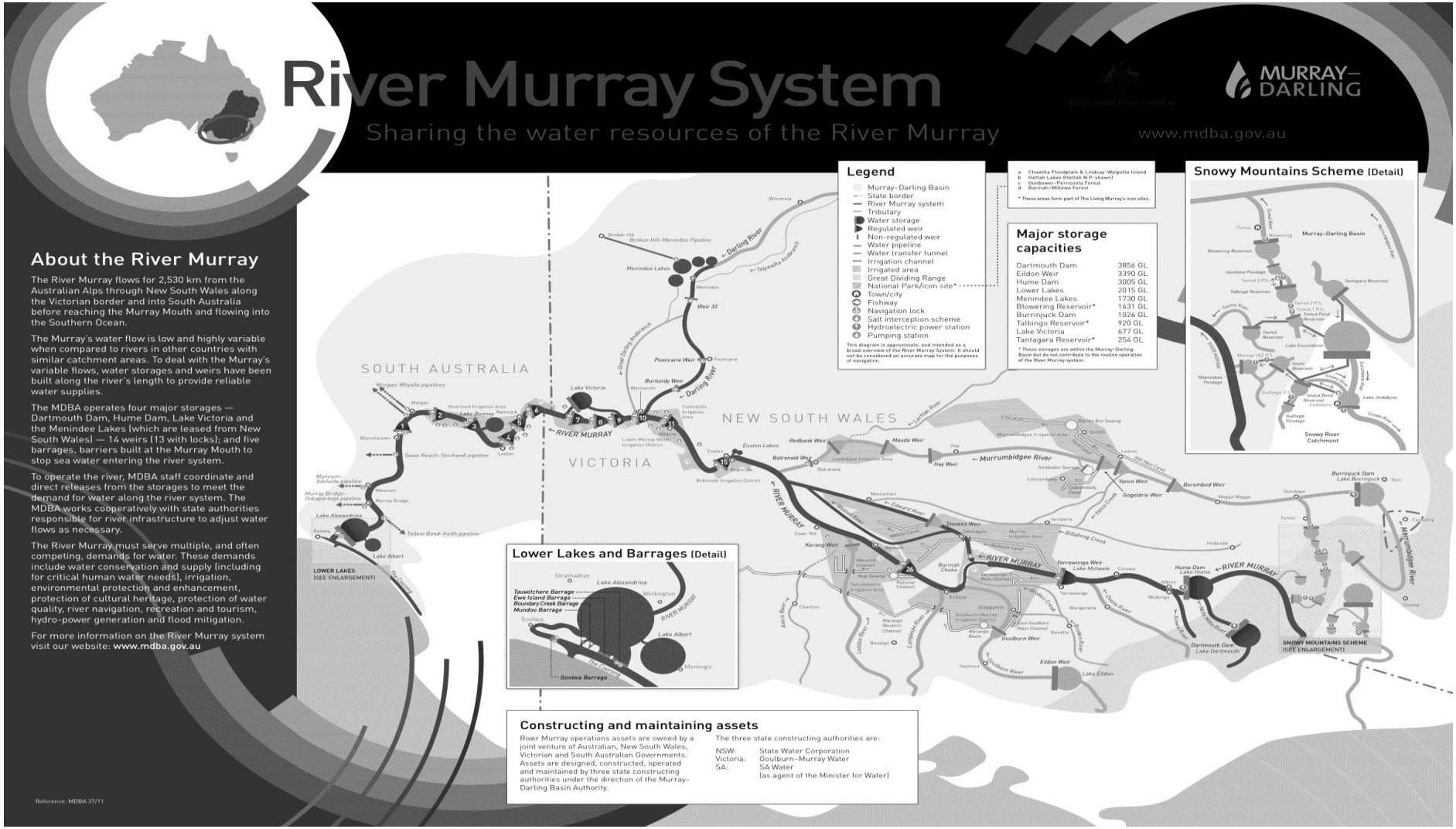
- http://www.accc.gov.au/publications/water-brokers-exchanges-your-fair-trading-obligations
- http://www.accc.gov.au/publications/water-trading-a-guide-to-your-rights

## 8.4 Information sources

A number of web sites provide updated information on water prices for trade in water shares and allocation water. Some useful sites are:

- http://waterregister.vic.gov.au/water-trading/allocation-trading
- http://www.murrayirrigation.com.au/water/water-trade/water-exchange/
- http://www.waterpoolcoop.com.au
- http://www.ruralcowater.com.au
- http://www.waterfind.com.au
- https://www.waterexchange.com.au

# Appendix 1: Murray River System (Source: MDBA)

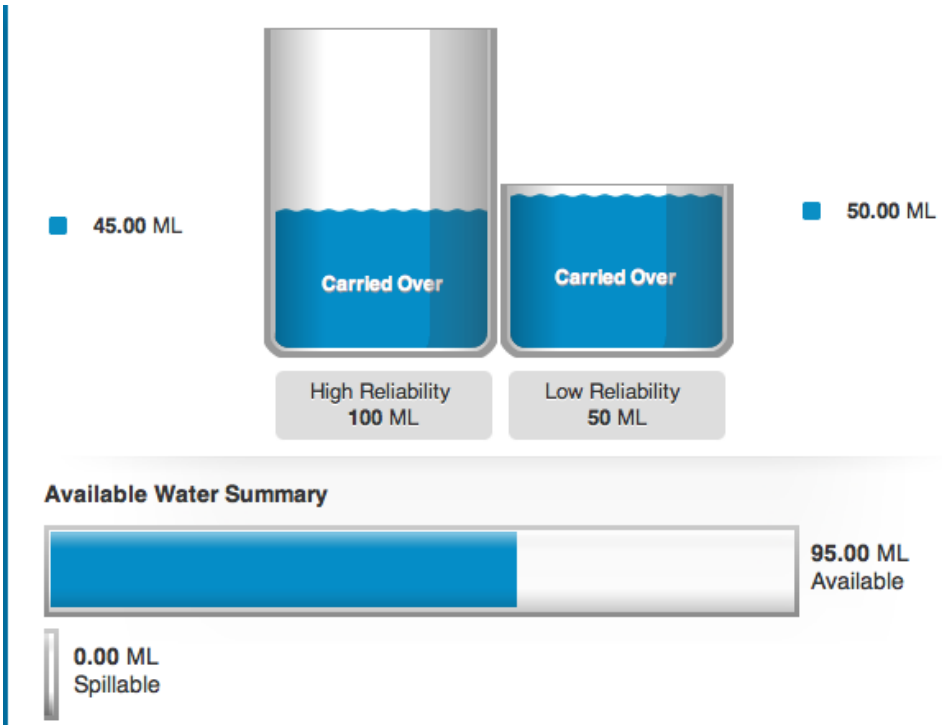


# Appendix 2: How carryover works – Victoria

Following is an example of how carryover works in Victoria. Diagrams have been sourced from the carryover calculator on the Victorian Water Register website. This is a useful tool for irrigators to look at the implications of carryover for their own individual circumstances (http://waterregister.vic.gov.au/water-entitlements/carryover/carryover-calculator).

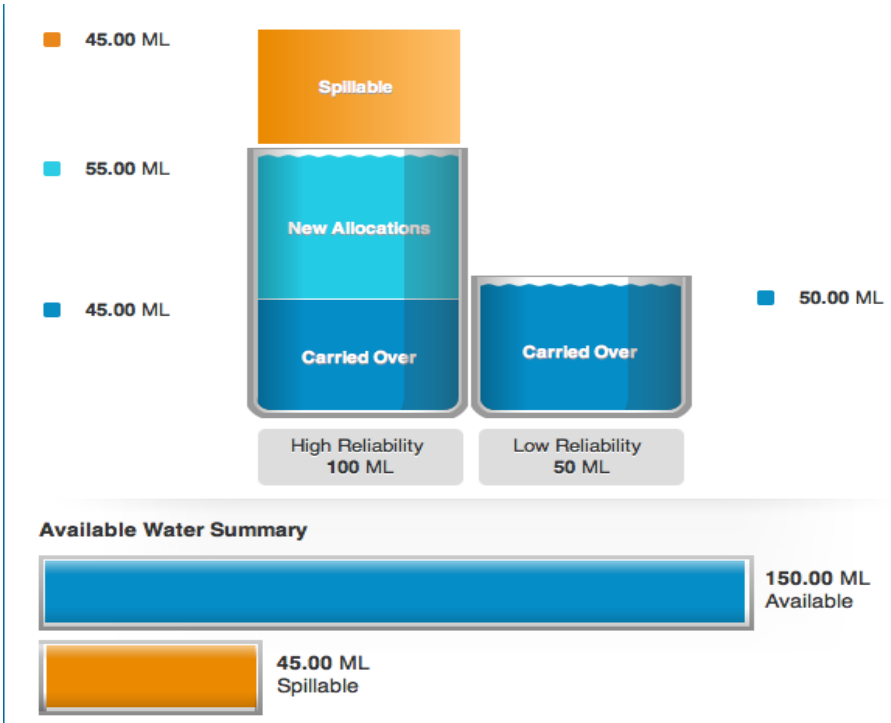
The example is based on an irrigator having 100 ML of HRWS and 50 ML of LRWS, and at 30 June having 100 ML of water in their ABA to which their entitlements are linked.

**On 1 July**



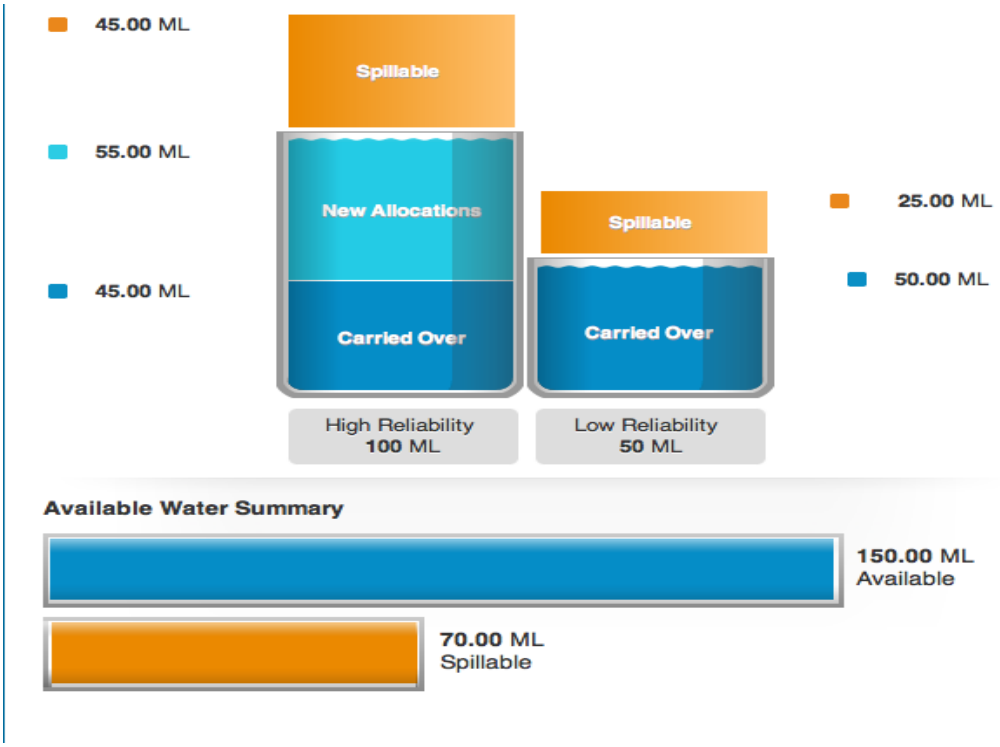

- 5% of the water deducted to allow for evaporation
- The remaining carryover water (95ML) is first carried over against the LRWS – 50ML – and then any additional water (45ML) is carried over against HRWS
- The irrigator has 95 ML available for use or trade

**By 30 September, allocation of HRWS reaches 100%**



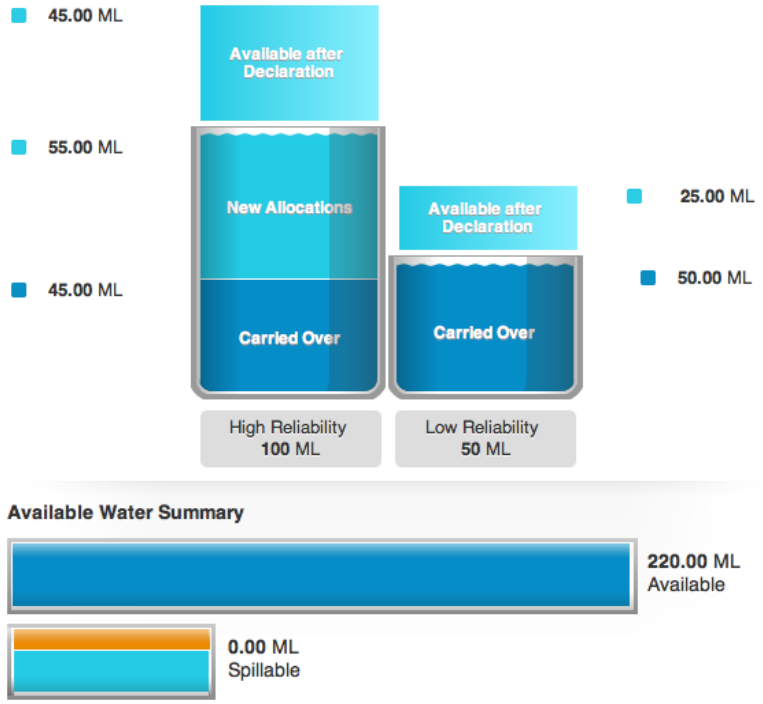

- The irrigator receives an additional 100 ML as a result of 100% allocation against HRWS. As the combination of allocation and water carried over cannot exceed 100% of entitlement holding, anything above this amount is transferred to the spillable account.
- As 45 ML was already carried over against HRWS prior to any allocations, only 55 ML of "space" was left against the HRWS. The available space is set by the carryover volume on 1 July. Even if you use water in the account before reaching 100% allocation, you cannot create "more" space for carryover.
- Reaching 100% allocation against HRWS has resulted in 45 ML being transferred to the spillable account.
- The water in the spillable account will remain quarantined in that account until the water authority declares a low risk of spill.
- If the storages spill while water is in the spillable account, water will be deducted from that account according to the level of the spill.
- The irrigator has access to 150 ML of water for use or trade.

**By November, there is a 50% allocation against LRWS**




- 50% allocation against LRWS means the irrigator will receive an additional 25 ML of water.
- As the LRWS space was fully utilised with carryover at the start of the season, this additional water will be automatically transferred to the spillable account and quarantined.
- 70 ML will now be in the spillable account
- Water carried over against LRWS can still end up in the spillable account but before it does, an allocation needs to be made against LRWS. Therefore, it is obviously a lower risk for carryover compared to using HRWS.

**December, and the water authority declares a low risk of spill**




- If there have been no spills from storages, then after the low spill risk declaration has been made, all water in the spillable account will be transferred to the allocation account and available for use or trade.
- 220 ML available for use or trade.

# Appendix 3: Glossary of terms

| Term | Definition |
|---|---|
| Allocation account | Allocations made throughout the irrigation season are credited to the allocation account (ABA – used to be called an allocation bank account, but the word “bank” is not widely used anymore as it was confused with financial banks) of each water shareholder. The ABA balance is the amount of water available to the owner of the associated water share for the current season. |
| Allocations | A percentage of the water share volume actually available to water share holders in a given water system during a given irrigation season.<br><br>Allocations in each water system are set by the managing authority at intervals throughout the irrigation season after assessing the available water resources |
| Allocation trade | The transfer of an allocation volume available in the current year |
| Annual Use Limit (AUL) | AUL – the maximum volume of water that can be used in any 12-month period that may be applied to the land specified in a water-use licence or water-use registration |
| Annual Delivery Allowance (ADA) | ADA – the annual mount of water that can be delivered to a property that is determined by the amount of delivery share (Victoria) or delivery entitlement (NSW) attached to that property |
| Carryover | An arrangement allowing a water entitlement holder to retain unused water allocations from one season into the next season to use and/or trade.<br><br>Carryover rules vary between States. |
| Casual User fee | Water deliveries above the annual delivery allowance are called casual use, and attract a casual use infrastructure fee. |
| Delivery Share (DS) | Victorian only – an entitlement to have water delivered to land in an irrigation area. It gives access to a share of the available capacity in the channel or piped network that supplies water to the property. Delivery share is defined by a rate of megalitres per day, which establishes how deliveries will be shared if everyone on the channel or piped network wants water on the same day. Delivery share is tied to the land and stays with the property if it is bought or sold. It also stays with the property if the water share is sold separately. 1 DS allows the owner access to 270 ML before casual user fees apply |

| Term | Definition |
|---|---|
| Delivery Entitlement (DE) | NSW only – an entitlement to have water delivered to land in an irrigation district and a share of the available flow in a delivery system. 1 DE allows the owner access to 1.2 ML before casual user fees apply |
| General security entitlement (GS) | A NSW water share against which seasonal allocations are made. They are of medium reliability. |
| High-reliability water share (HRWS) | A water share against which seasonal allocations are made as a first priority. |
| Irrigation area | A geographic area with defined boundaries within which water is distributed for irrigation using infrastructure owned and operated by a water authority |
| Limited term transfer | The transfer of a right to future allocations under a water share for a limited period (lease) to the owner or occupier of land specified in a water-use licence or registration |
| Low-reliability water share (LRWS) | A water share with a relatively low reliability of supply. In Victoria, allocations against these shares will only occur if there is still water available after allocation of HRWS in the current year and with minimum inflows to meet HRWS in the following year |
| Regulated water system | A water system where the flows of the river is regulated through the operation of major storages or weirs to manage water supplies |
| Reliability | Water shares are classed according to their reliability of supply, which is defined by the frequency with which full season allocations are expected to be available. |
| Trading zone | A defined area with which trade between users can always occur, or can always occur subject to a few set conditions. Trade between trading zones are also possible but will be subject to conditions defined in the trading rules |
| Trading zone source | The trading zone that determines where the water share and allocation can be traded an where the allocation can be used |
| Trading zone use | The trading zone where the allocation is used. Can be different to Trading Zone Source under a tagging regime in regulated systems |
| Unassociated water share | Water shares whose owner does not also own or occupy land covered by a water-use licence and nominated for the water allocation use. These water shares are held independently from land |

| Term | Definition |
|---|---|
| Unbundling | The conversion of a prior water right or take-and-use licence in a declared water system into three separate entitlements:<br>▪ a water share<br>▪ a delivery share or extraction share: and<br>▪ a water-use licence |
| Unregulated water-system | A river system where no major dams or weir structures have been built to assist in the supply or extraction of water |
| Water corporation | Charged with supplying water to townspeople, farmers and other water users across Victoria for urban, industrial and commercial use. They administer diversion from waterways and the extraction of groundwater. The authority must provide the water delivery service to the owner occupier of each serviced property in its irrigation district at the volumes and for the periods determined by the authority. Water authority functions in relation to their irrigation district include:<br>▪ providing, managing and operating systems for the delivery of water<br>▪ identifying community needs for irrigation, drainage, salinity mitigation<br>▪ planning for future needs of the community relating to these matters<br>▪ developing and implementing programs for improved irrigation |
| Water share | A legally recognised, secure share of the water available for use in a defined water system. A water share is specified as a maximum volume of seasonal allocation that may be made against that share. |
| Water share transfer | The transfer of ownership of a water share. |

Source: Adapted from The Victorian Water Register website: http://waterregister.vic.gov.au/about/water-dictionary?start=20